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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,558	KIM, BONG-TAEK	
	Examiner	Art Unit	
	JONATHAN M. DAGER	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-14* is/are rejected.

7)☒ Claim(s) *6 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *28 December 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 6 contains the embodiment "beacon information DB". It is not understood from the specification what exactly the "DB" refers to in the claim language or specification. Appropriate clarification/correction is required.

Claim 8 is objected to because of the following informalities: grammatical errors. Claim 8 appears to be a direct translation of the parent document. Appropriate clarification/correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 10 refers to a “cluck generator” in the embodiments. While this phrase is found throughout the specification, it is not known what exactly a “cluck” generator consists of. Thus, the phrase renders the claim as non-enabling in that one of ordinary skill cannot ascertain what the specific device is, or make use of the invention.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 12, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 10; as mentioned above, it cannot be discerned what exactly a "cluck generator" consists of. Thus, the phrase renders the claim indefinite.

The term "broadband" in claim 12 is a relative term which renders the claim indefinite. The term "broadband" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Regarding claim 14, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kane (US 2004/0006413), and further in view of Lacote (US 2004/0267415) and Ward (US 2005/0024198).

Regarding claims 1, 6-9, 10, and 12, as best understood, Kane discloses that some train control systems, such as Track Warrant Control System sold by RDC (Railroad Development Corporation), have automated some of the track warrant control method, such as by sending the warrant to the train via a computer system. Another system, Automatic Block Signaling (ABS), provides for automated wayside signaling of block status and authority to enter or occupy a block. In this system, track warrants may overlap and the conductor or engineer uses the automatic wayside signals to determine when and how to proceed in a given block. Again, human beings are involved and errors are possible (para 0006).

Thus, Kane discloses that it is already known for ground (wayside) equipment

Kane also discloses that it is known to automate the braking of a train due to block occupancy. For example, a rudimentary system known as Automatic Train Stop (ATS), sold by Union Switch and Signal Inc., functions by means of a mechanical contact between a wayside trip arm and a brake emergency trip switch or cock mounted to the car. If the wayside signal is in a stop condition and the train passes the signal, the wayside trip arm activates the emergency brake switch, thereby initiating an emergency brake operation. One problem with a rudimentary system such as this is that the braking operation is not started until the train passes the wayside switch, which means the train will not stop until some point after the switch. Thus, the system will not prevent a collision with an object that is close to the wayside signal (para 0009).

Kane discloses that in an Automatic Train Control (ATC) system, train location information, speed information, and train control information are continually exchanged between a train cab and computerized wayside controllers in real time (in some systems, track rails are used to carry this information). In this system, it is not necessary for a conductor or engineer to look for wayside signals. If a wayside signal is missed by a conductor or engineer, or conditions change after the wayside signal is passed, the information is available to the conductor or engineer in the cab. Some ATC systems automatically apply the brakes if a stop signal is passed. As discussed above in connection with the ABS system, such after-the-fact braking systems may not prevent collision with an object located in close proximity to a wayside signal. Other systems, such as the Advanced Train Control System proposed by Rockwell International, will automatically apply the brakes if a track warrant is about to be exceeded.

ATC system has been combined with a Positive Train Stop (PTS) system. The PTS system uses transponders along the tracks and on-board receivers to supplement the ATC system. PTS is an intelligent system that anticipates signaling and will stop or slow the train automatically without operator input. For example, as discussed above, while ATC will stop the train automatically if the train runs through a stop signal, PTS will stop the train before actually going through a stop signal. In addition, the PTS system allows for "civil-speed" and "temporary construction" speed restrictions. The term Advanced Speed Enforcement System (ASES) is used when ATC and PTS are combined (para 0013).

Thus, it is known that the wayside equipment can transfer the ground information using an ATS member connected to a track occupancy detector through narrow space data communication (transponder/transceiver system), and a program part for inputting ground data to

the wayside equipment. It is noted that the ATC system utilizes transponders, which suggests the use of balises.

Further, the above citations clearly disclose the ATS and ATP functionality of the onboard equipment, as well as an onboard transponder system.

Kane discloses that the current onboard equipment includes an axle drive speed indicator 105 which is also connected to the control module 110. The axle drive speed indicator 105 is a tachometer which measures the axle rotation, from which the speed of the train can be derived if the wheel size is known. End-of-axle magnetic pick-ups are used in some embodiments. It is also possible to use a signal that measures the rotation speed of the motor driving the axle to perform this function. In the event that the GPS system becomes unavailable, the system can operate by estimating distance traveled from the rotation of the axle or motor (para 0032).

Thus, Kane discloses utilizing a rotary type speed detector connected to the shaft of the wheel, as well is displaying the train speed.

A display 180 connected to the control module 110 is used to present various information to the conductor or engineer. An exemplary display 200 is illustrated in FIG. 2. The display 200 shows the current train speed in field 210 and the maximum allowable speed (if a maximum is in effect) in field 212. The display 180 also shows the train's exact position in field 214 and the limits of the train's authority at filed 216. Also included in the display 180 is a first graph 218 indicating the grade of the tracks in the immediate area of the train and a second graph 220 indicating the direction of the track relative to the locomotive cab. The display 180 also lists, in fields 222 and 224, current and upcoming speed restrictions over limited areas of the track (in the

example of FIG. 2, the speed restrictions are "Form A" speed restrictions, which will be discussed in further detail below) (para 0043).

The train system 100 is capable of two modes of operation. In the semiautomatic mode, movement of the train is under the control of the conductor or engineer provided that the conductor or engineer operates the train in an acceptable manner. In the automatic mode, the system 100 controls the movements of the train. In this mode, the conductor or engineer intervenes only when necessary to deal with unforeseen situations, such as the presence of an unauthorized person or thing on the tracks (para 0047).

Thus, the onboard equipment of Kane is fully capable of displaying speed information, ground information, an operation switch for selecting an operating mode, a train brake controller (also see brake interface, figure 1 item 150).

Lastly, Kane discloses that connected to the control module is a communications module 120. The communications module is responsible for conducting all communications between the system 100 and the central dispatcher computer system (not shown in FIG. 1). These communications may occur in a variety of ways, such as over the air or through the rails of the train track. In some embodiments, wayside signals transmit information to the system 100. All equipment necessary for such communications (e.g., antennas) are connected to the communications module 120 (para 0029).

Thus, Kane discloses that the onboard equipment does include means for transmitting onboard information and ground information to a central control system and receiving radio commands from the central control system.

Kane does not explicitly disclose the use of "balises", which are well known in ATP functions. While Kane does disclose transponder technology, it is not disclosed the onboard coil and oscillator, as disclosed.

Lacote, however, teaches a method and apparatus for controlling trains, in which method and apparatus, the location and the speed of a train on the line are acquired. A location specification is generated as a function of the acquisition, so that a movement control magnitude is delivered for controlling movement of the train. In the invention, a braking distance for the preceding train and the control magnitude are computed on the basis of the location specification plus the computed braking distance. Application in particular to ERTMS/ETCS systems (abstract).

Lacote also teaches the well known use of the acquisition means and the computing unit are, according to a characteristic of the invention, situated in transponders or "balises" distributed along the line on which trains run, and suitable for transmitting the location specification to readers provided on board the trains, as the reader goes past or over the balise, and the computing member is situated on board the following train and is connected to said reader (para 0017).

Thus, Lacote teaches an alternate method of train/wayside communication via the use of a transponder system in a balise.

The device of Kane has outlined embodiments of the claimed invention. That is, a train communication network consisting of wayside equipment,

Lacote teaches the missing embodiment of the use of balises, which are a kind of wayside equipment which respond to train interrogations, and are further well known to be part of ATP systems.

All of the components and methods are known in the above prior art. The only difference is a combination of these elements into a single device.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the balise communication system of Lacote onto the base device of Kane, since both systems could be used in combination to produce the predictable result of a balise transmitting ground information through narrow space data communication.

Combining prior art elements according to known methods to yield predictable results is a rationale to support a conclusion of obviousness. See MPEP 2143(a).

Still, while it might be implicit that a transponder system contains an onboard coil and oscillator, it is not explicitly taught by the above combination.

Ward, however, teaches an RFID system in which utilizes an antenna impedance matching network for an inductively coupled identification system 40 in accordance with a first embodiment of the present invention. The identification system 40 includes an interrogator 52 and a transponder 60. The interrogator 52 includes various associated oscillator and coil driver circuitry 42 that provides a signal to a series drive capacitor 44 and then to a tank capacitor 46 and a coil 48. The series drive capacitor 44, the tank capacitor 46, and the coil 48 may be viewed as the emitter for an inductive coupling device, such as the interrogator 52. The signal from the

transponder 60 is picked up from the coil 48 and demodulation and processor circuitry 50 process the signal into the desired form for a user of the interrogator 52. The transponder 60 includes a coil 54 and a tank capacitor 56 that is linked to associated circuitry 58. The coil 48 and the coil 54 inductively couple so that the interrogator 52 can read the information stored within the transponder (para 0022).

All of the components and methods are known in the above prior art. The only difference is a combination of these elements into a single device.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the transponder components as taught by Ward onto the combination of Kane and Lacote, since all systems could be used in combination to produce the predictable result of the onboard equipment containing an oscillator and multiple coils.

Combining prior art elements according to known methods to yield predictable results is a rationale to support a conclusion of obviousness. See MPEP 2143(a).

Regarding claims 2 and 3, Kane discloses that the current onboard equipment includes an axle drive speed indicator 105 which is also connected to the control module 110. The axle drive speed indicator 105 is a tachometer which measures the axle rotation, from which the speed of the train can be derived if the wheel size is known. End-of-axle magnetic pick-ups are used in some embodiments. It is also possible to use a signal that measures the rotation speed of the motor driving the axle to perform this function. In the event that the GPS system becomes

unavailable, the system can operate by estimating distance traveled from the rotation of the axle or motor (para 0032).

Kane discloses that connected to the control module is a communications module 120. The communications module is responsible for conducting all communications between the system 100 and the central dispatcher computer system (not shown in FIG. 1). These communications may occur in a variety of ways, such as over the air or through the rails of the train track. In some embodiments, wayside signals transmit information to the system 100. All equipment necessary for such communications (e.g., antennas) are connected to the communications module 120 (para 0029).

The system 100 includes a control module 110, which typically, but not necessarily, includes a microprocessor. The control module 110 is the center of the train control system and is responsible for controlling the other components of the system. Connected to the control module is a communications module 120. The communications module is responsible for conducting all communications between the system 100 and the central dispatcher computer system (not shown in FIG. 1). These communications may occur in a variety of ways, such as over the air or through the rails of the train track. In some embodiments, wayside signals transmit information to the system 100. All equipment necessary for such communications (e.g., antennas) are connected to the communications module 120 (para 0029)

The GPS receiver 130 continuously supplies the control module 110 with position information concerning the train to which the control system 100 is attached. This information allows the control module 110 to determine where it is at any point in time. The GPS receiver is preferably sufficiently accurate to unambiguously determine which of two adjacent tracks a train

is on. By using train position information obtained from the GPS receiver 130 as an index into the map database 140, the control module can determine its position relative to other points of interest on the railroad such as switches, sidings, stations, etc. As discussed in further detail below, this allows the control module 10 to warn the conductor or engineer if an authority (speed, position, etc.) is about to be exceeded and, if required, to automatically stop or slow down the train before the authority is exceeded (para 0031).

Kane discloses that communications between the various components of the system 100 can be conducted using methods currently developed or developed in the future. In some embodiments employing a modular construction wherein logical portions of the system are in separate physical units, one form of communication that may be used is power line carrier communication. Power line carrier communication involves transmitting information signals over conductors carrying electrical power (power line carrier communication is well known to those of skill in the art and thus will not be discussed in further detail herein) (para 0058).

Thus, Kane discloses the operation controller, output controller, and speed analyzer, and the electrical converter, as well as the ATP stop device of claim 3 including GPS capability.

Lacote teaches that Communications between the various components of the system 100 can be conducted using methods currently developed or developed in the future. In some embodiments employing a modular construction wherein logical portions of the system are in separate physical units, one form of communication that may be used is power line carrier communication. Power line carrier communication involves transmitting information signals over conductors carrying electrical power (power line carrier communication is well known to those of skill in the art and thus will not be discussed in further detail herein) (abstract).

Thus, the inventions of Lacote and Kane, as combined above, teach the target distance controller as described.

Regarding claims 4, 13, and 14, as best understood, Kane discloses that a map database 140 is connected to the control module 110. The map database 140 preferably comprises a non-volatile memory such as a hard disk, flash memory, CD-ROM or other storage device, on which map data is stored. Other types of memory, including volatile memory, may also be used. The map data preferably includes positions of all wayside signals, switches, grade crossings, stations and anything else of which a conductor or engineer is required to or should be cognizant. The map data preferably also includes information concerning the direction and grade of the track. Use of the information in the map database 140 will be discussed below (para 0033).

Regarding claim 5, Kane, as modified above by Lacote teaches an invention drawn to implementing the European Rail Traffic Management System/European Train Control System (ERTMS/ETCS), referred to below as "the ERTMS". This system aims to establish an international standard for systems for automatically controlling trains and, in particular aims to make cross-boarder traffic interoperable, and to make train control systems interoperable from one country to another and to make it possible to increase the density of train traffic on the same track with an optimum and uniform level of safety (Lacote, para 0002).

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kane (US 2004/0006413), Lacote (US 2004/0267415) and Ward (US 2005/0024198), as applied to claim 1 above, and further in view of Ralph (US 6,823,242).

Regarding claim 11, Kane discloses that if a message from the EOT GPS receiver 171 has not been received for some predetermined period of time, or if the data in the message has been corrupted (e.g., the speed in the message is faster than the train can travel), or does not agree with the information from the GPS receiver 130 in the locomotive at the front of the train, the control module 110 can either display an operator alert or, in some embodiments, stop the train and notify the dispatcher (para 0035). Kane is deficient in that the alarm is displayed, and does not comprise an aural (voice) alarm.

Neither Lacote nor Ward teaches this embodiment.

Ralph, however, teaches also shows a voice generation module 94 (contained in dashed-line format), which further includes a wheel alarm module 96, a train error module 98, and a "no defects" module 100. Post train processing module 92 further includes a "detector overhead" module 102. Module 94 represents the generation of speech data as needed from the results of the alarm data produced at the output of ratio engine 90 (column 11 lines 40-48).

All of the components and methods are known in the above prior art. The only difference is a combination of these elements into a single device.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the voice generation module of Ralph onto the combination of Kane, Ward, and Lacote, since all systems could be used in combination to produce the predictable result of a detailed voice warning in a sensed alert condition.

Combining prior art elements according to known methods to yield predictable results is a rationale to support a conclusion of obviousness. See MPEP 2143(a).

6. It is noted that the claims contain multiple statements of intended use or field of use (e.g. "for implementing", "for transferring", "for converting", "wherein…for recoding", etc.). These statements of intended use or field of use, or "wherein" clauses are essentially method limitations. Thus, these claims, as well as other statements of intended use, do not serve to patentably distinguish the claimed structure over that of the reference.

See MPEP § 2114 which states:

> A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim.
>
> Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions.
>
> Apparatus claims cover what a device is not what a device does.

As set forth in MPEP § 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

Additionally, the terms "configured to" or "arranged to" are considered to be structurally modified statements and are not intended use. Claims amended to include the above listed language may patentably distinguish themselves structurally.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN M. DAGER whose telephone number is (571)270-1332. The examiner can normally be reached on 0830-1800 (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JD
19 January 2008

/Jack W. Keith/
Supervisory Patent Examiner, Art Unit 3663